MISCELLANEA ZOOLOGICA HUNGARICA

Tomus 2. 1984 p. 17—28

Helminths from small mammals in the Čergov Mountains (Western Carpathians, Czechoslovakia)*

By

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(Received November 28, 1983)

The paper is dedicated to the memory of Tibor WEISZ (1914—1983).

ABSTRACT. As based on examination of 308 specimens of 5 insectivorous and 5 rodent species, 26 cestode, 20 nematode, and 1 acanthocephalid species are reported from the Čergov Mts (Czechoslovakia).

There are a number of comprehensive faunistical - taxonomical publications dealing with the helminths of Slovakian small mammals (ERHARDOVÁ, 1958; MITUCH, 1964, 1974; PROKOPIČ, 1959, TENORA, 1967; TENORA & MÉSZÁROS, 1975; TENORA & MURAI, 1980). Recent data are given by MÉSZÁROS, MURAI & MATSKÁSI (1982) and MURAI, MÉSZÁROS & ŠTOLLMANN (1983). Inspite of all these works, the helminth fauna of small mammals in the Čergov Mts had previously been unknown.

MATERIAL AND METHOD

We carried out helminthological examination of 10 species (5 insectivores and 5 rodents) between 1980 and 1983, on a total of 308 specimens. We found the occurrence of 26 cestode, 20 nematode and 1 acanthocephalid species (see Tables 1 and 2).

The examined hosts are from the following 4 localities: 1) Hertník, 26-28 Aug., 1980; 2) Lenartov 10-12 Nov., 1981 and 20-23 April, 1982; 3) Livov 20-23 April, 1982; 4) Križe, 21 April, 1982 and 14 May, 1983 (map of the localities is given by MÉSZÁROS & ŠTOLLMANN, 1984).

Some of the host specimens were dissected in the field, the internal organs of part of the material was fixed in 5% formaldehyde solution and examined subsequently. The cestods were stained with Ehrlich's haematoxylin and aluminous carmine. The nematods were made translucent by lactophenol.

REVIEW OF RECORDED SPECIES

CESTODA

ANOPLOCEPHALIDAE

Anoplocephaloides dentata (Galli-Valerio, 1905)

Hosts: Pitymys subterraneus, Microtus arvalis. - Localization: caecum and endpart of small intestine. - Intensity: 1-4 specimens. - Date of collection: in P. subterraneus, Lenartov 10-12 Nov., 1981 (1 case), Lenartov 20-23 April, 1982 (1 case); in M. arvalis, Lenartov 10-12 Nov., 1981 (1 case).

*Report No. 15 from the project "Complex parasitological studies on small mammal populations", a co-operation between the Department of Zoology, Hungarian Natural History Museum, Budapest, and the Institute of Experimental Biology and Ecology, Slovak Academy of Sciences, Research Station Staré Hory.

Table 1 Extensity of helminths of insectivores in the Čergov Mts

Helminth species \ Host species	Sorex araneus	Sorex alpinus	Sorex minutus	Neomys fodiens	Neomys anomalus	Total
	37++	7	5	8	1	58
CESTODA						
Choanotaenia crassiscolex	15*	-	-	1	-	16
Hymenolepis bifurca	-	-	-	2	-	2
Hymenolepis hamanni	-	-	-	1	-	1
Hymenolepis montana	-	-	-	3	-	3
Hymenolepis integra	-	-	-	4	-	4
Hymenolepis omissa	-	-	-	4	-	4
Hymenolepis furcata	1	-	-	-	-	1
Hymenolepis schaldybini	3	2	-	-	-	5
Hymenolepis scutigera	1	-	-	-	-	1
Hymenolepis spinulosa	1	-	-	-	-	1
Hymenolepis stefanskii	1	-	-	-	-	1
Hymenolepis tiara	-	-	-	1	-	1
Hymenolepis infirma	4	3	-	-	-	7
Hymenolepis tripartita	4	-	-	-	-	4
Mesocestoides sp. larva	1	1	-	-	-	2
NEMATODA						
Parastrongyloides winchesi	5	-	-	-	-	5
Angiostrongylidae sp.	1	-	-	-	-	1
Porroceacum sp. larva	8	-	-	-	-	8
Longistriata depressa	2	1	-	-	-	3
Longistriata pseudodidas	7	1	1	-	-	9
Longistriata neomi	-	-	-	1	-	1
Pseudophysaloptera soricina	1	-	-	-	-	1
Capillaria kutori	-	-	1	1	-	2
Capillaria incrassata	1	-	-	-	-	1
Thominx oesophagicola	2	-	-	-	-	2
Soboliphyme soricis	2	-	-	-	-	2
ACANTHOCEPHALA						
Centrorhynchus buteonis (juvenile)	1	1	-	-	-	2

++Number of animals examined.

*Number of animals infested.

Table 2 Extensity of helminths of rodents in the Čergov Mts

Helminth species \ Host species	Apodemus agrarius	Apodemus flavicollis	Clethrionomys glareolus	Pitymys subterraneus	Microtus arvalis	Total
	6	25	155	55	9	250
CESTODA						
Anoplocephaloides dentata	-	-	-	2	1	3
Paranoplocephala sp. 1	-	-	34	-	-	34
Paranoplocephala sp. 2	-	-	-	16	-	16
Catenotaenia cricetorum	-	-	5	-	-	5
Hymenolepis asymmetrica	-	-	-	7	-	7
Hymenolepis diminuta	-	2	-	-	-	2
Hymenolepis horrida	-	-	27	6	-	33
Mesocestoides sp. larva	-	-	1	-	-	1
Hydatigera taeniaeformis larva	-	1	-	3	-	3
Taenia martis larva	-	-	3	-	-	3
Taenia tenuicollis larva	-	-	8	6	-	14
Tetratirotaenia polyacantha larva	-	-	-	1	-	1
NEMATODA						
Heligmosomum costellatum	-	-	-	29	1	30
Heligmosomum mixtum	-	-	78	-	-	78
Heligmosomoides p. polygyrus	-	16	-	-	-	16
Heligmosomoides glareoli	-	-	4	-	-	4
Boreostrongylus minutus	-	-	3	16	4	23
Syphacia frederici	-	5	-	-	-	5
Syphacia montana	-	-	-	9	-	9
Syphacia nigeriana	-	-	-	-	1	1
Capillaria annulosa	-	3	-	-	-	3

Paranoplocephala sp. 1

Host: Clethrionomys glareolus. - Localization: small intestine. - Intensity: 1-4 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (5 cases), Lenartov 10-12 Nov., 1981 (11 cases), Lenartov 20-23 April, 1982 (1 case), Livov 20-23 April, 1982 (16 cases), Križe 14 May, 1983 (1 case).

Note. The specimens represent a new species closely related to P.gracilis Tenora & Murai, 1980, the formal description of which is in preparation.

Paranoplocephala sp. 2

Host: Pitymys subterraneus. - Localization: small intestine. - Intensity: 1-2 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case), Lenartov 10-12 Nov., 1981 (3 cases), Lenartov 20-23 April, 1982 (1 case), Livov 20-23 April, 1982 (11 cases).

Note. The cestods of this new species related to P. omphalodes (Hermann, 1783), were found consistently in P. subterraneus in the Čergov Mts. A formal description of this small species with small scolex and unilateral position of genital pores is in preparation.

CATENOTAENIIDAE

Catenotaenia cricetorum Kirshenblat, 1949

Host: Clethrionomys glareolus. - Localization: small intestine. - Intensity: 1-4 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case), Lenartov 10-12 Nov., 1981 (4 cases).

Note. The most common host of this species is C. glareolus (but also occurs in other microtines). The specimens from the Čergov Mts are in all respect similar to specimens from other parts of the Carpathian basin (MURAI, 1974; MÉSZÁROS & MURAI, 1979).

DILEPIDIDAE

Choanotaenia crassiscolex (Linstow, 1890) (Figs 1-2)

Hosts: Sorex araneus and Neomys fodiens. - Localization: posterior part of the small intestine. - Intensity: 2-40 specimens. - Date of collection: in S. araneus, Hertník 26-28 Aug, 1980 (2 cases), Lenartov 10-12 Nov., 1981 (11 cases), Livov 20-23 April, 1982 (2 cases); in N. fodiens, Livov 20-23 Apr., 1982 (1 case).

Note. C. crassiscolex (syn.: Anomotaenia subterranea Cholodkowsky, 1906) is the most common parasite of shrews. The collected material contains a large number of specimens which consist of only a few proglottids and contained no mature eggs; this was undoubtedly due to the late autumn and early spring collection dates. The few summer specimens were 15 mm long with 1 mm greatest width. The scolex is distinctive with its characteristic shape and 17-20 hooks of 45-50 µm.

HYMENOLEPIDIDAE*

Hymenolepis asymmetrica Janicki, 1904

Host: Pitymys subterraneus. - Localization: small intestine. - Intensity: 1-6 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case), Livov 20-23 April, 1982 (6 cases).

Note. This species is a parasite of microtines in the Carpathian Mts, but was found only in P. subterraneus in the Čergov Mts.

Hymenolepis diminuta (Rudolphi, 1819)

Host: Apodemus flavicollis. - Localization: small intestine. - Intensity: 1-3 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (2 cases). - H. diminuta is a common parasite of A. flavicollis.

Hymenolepis horrida (Linstow, 1901)

Hosts: Clethrionomys glareolus and Pitymys subterraneus. - Localization: small intestine. - Intensity: 1-15 specimens. - Date of collection: in C. glareolus, Hertník 26-28 Aug, 1980 (19 cases), Lenartov 10-12 Nov., 1981 (6 cases), Lenartov 20-23 April, 1982 (1 case), Livov 20-23 April, 1982 (1 case); in P. subterraneus, Lenartov 20-23 April, 1982 (1 case), Livov 20-23 April, 1982 (5 cases).

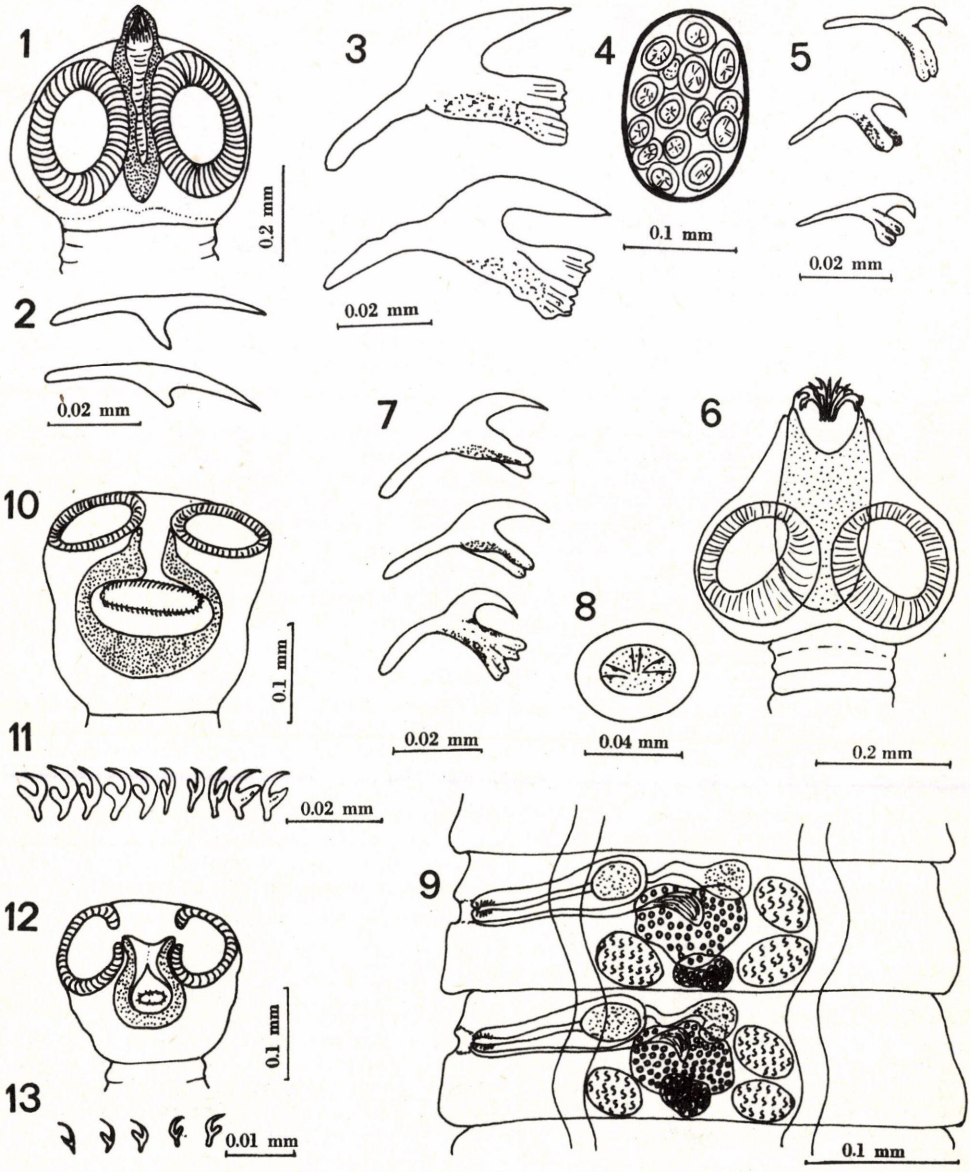
Note. The morphology of the H. horrida specimens correspond with the description by MURAI & TENORA, 1973.

Hymenolepis bifurca (Hamann, 1891) (Figs 3-4)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: one specimen in each of the two infested water-shrews. - Date of collection: Lenartov 10-12 Nov., 1981 (2 cases).

Note. H. bifurca is a specific hymenolepidid of Neomys species. Scolices of the two specimens examined are with the following characteristics: Scolex diameter 0.4 mm, rostellum 0.15 mm with 10 hooks of 65-73 µm length and 57-65 µm at the basis, with bifurcate guard.

*The hymenolepidid species parasitizing small mammals have been referred to several genera by various authors. Since these genera do not form a system which reflects the true interrelationship of the taxa, until a new revision clarifies their status all the species are relegated to genus Hymenolepis, as based on the works of BAER & TENORA (1970) and VAUCHER (1971).



Figs 1-2: Choanotaenia crassiscolex (1= scolex; 2= shape of rostellar hooks)
Figs 3-4: Hymenolepis bifurca (3= shape of rostellar hooks; 4= egg capsule)
Fig. 5: H. hamanni, shape of rostellar hooks
Figs 6-9: H. montana (6= scolex; 7= shape of rostellar hooks; 8= egg; 9= mature proglottids)
Figs 10-11: H. integra (10= scolex; 11= rostellar hooks)
Figs 12-13: H. omissa (12= scolex: 13= rostellar hooks) (Figs 1-13 orig. by Murai)

Hymenolepis hamanni (Mrazek, 1891) (Fig. 5)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: 2 specimens. - Date of collection: Lenartov 10-12 Nov., 1981 (1 case).

Note: H. hamanni parasites Neomys species. The examined specimens have scolices 0.18-0.20 mm wide, diameter of rostellum is 65 µm, hooks 17-18 in number, 27 µm long, at the basis 25 µm, guard bifurcate.

Hymenolepis montana Murai, 1984 (Figs 6-9)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: 2-20 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case), Lenartov 10-12 Nov., 1981 (2 cases).

Note. Length of the species described elsewhere (MURAI, 1984) is 14-18 mm, greatest width 0.3 mm. Diameter of scolex 0.30-0.38 mm, length 0.35 mm. Diameter of suckers 150-180 µm, that of rostellum 90-100 µm. Size of rostellar sac 150-270 µm. Number of hooks always 10, characterized by bifurcate guard, 37-40 µm long, 35-37 µm at the basis. Testes arranged in triangle, cirrus sac 60-100 µm long and 20 µm wide. Uterus saccular, with 20-24 ripe eggs in the old mature proglottids, not forming egg capsule. Eggs ovoid, 33-38 by 40-52 µm in size, oncosphere 20x35 µm in size, embryonal hooklets 9 µm long. A common parasite of N. fodiens all over the Carpathians.

YAMAGUTI (1959) erected a separate genus to accommodate the species with bifurcate guards: Triodontolepis Yamaguti, 1959. The species referred into this genus parasite shrews, rodents and bats. The description of the genus included the formation of egg capsule from the last proglottids. PROKOPIČ (1972) accepted the genus as valid and among others referred Hymenolepis bifurca and H. hamanni here. Neither of the authors made note of the significance of the fact that some of the species have consistently 10 hooks, whereas in others the number of hooks ranges from 17 to 50. The formation of the egg capsule is also not fully demonstrated for all species, therefore until such time when the genus becomes better known it is best to retain the generic name Hymenolepis.

Hymenolepis integra (Hamann, 1891) (Figs 10–11)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: 10-73 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case), Lenartov 10-12 Nov., 1981 (3 cases).

Note. The mature specimens of H. integra are 10-14 mm long, with greatest width of 0.3 mm. Diameter of scolex 0.21-0.24 mm. Rostellum deeply retracted into scolex, 110 µm in diameter with a crown of numerous (more than 60) minute hooks 11-13 µm in length. Diameter of suckers 100 µm. The 3 testes arranged in a triangle. Size of cirrus sac 75x15 µm, that of the finely spinulous cirrus 50x15 µm. Ovary and vitelline gland centrally situated in the proglottid. After the 170th proglottid the formation of egg capsule may be observed. Measurements of ovoid egg capsules 120 by 180 µm, each containing 40-50 eggs. Size of eggs 50 by 66 µm, that of the oncosphere 18 by 27 µm, length of embryonal hooks 10 µm.

Hymenolepis omissa Baer & Joyeux, 1934 (Figs 12-13)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: 10-65 specimens per host. - Date of collection: Lenartov 10-12 Nov., 1981 (4 cases).

Note. Measurements of the mature specimens of H. omissa are as follows. Length of strobila 4-5 mm, greatest width 0.2 mm. Diameter of scolex 0.2-0.24 its length 0.3-0.36 mm. The rostellum is situated deep in the scolex, its diameter is 20-30 µm, with a row of 24 hooks on it, length of hooks 5 µm. Testes arranged triangularly, the ovary and vitelline gland placed centrally. Size of cirrus sac 120 by 25 µm, cirrus with strong spines, 50 by 25 µm in size. Formation of egg capsule beginning in the 55th segment, its size 75 by 170 µm with 9-12 eggs. Eggs measure 55 by 40 µm, oncospheres 37 by 25 µm, length of embryonal hooks 10 µm.

Note. GENOV (1980) referred the last two species to the genus Coronacanthus Spassky, 1954. The morphology of the two species corresponds well with the description given by GENOV. I wish to point out one characteristics, however, the cirrus sac and cirrus of H.omissa is relatively large in comparison with that of H. integra. Both species are common parasites of Neomys species.

Hymenolepis furcata (Stieda, 1862)

Host: Sorex araneus. - Localization: small intestine. - Intensity: one specimen. - Date of collection: Hertník, 26-28 Aug., 1980 (1 case). - H. furcata is a well-known parasite of S. araneus in Slovakia.

Hymenolepis schaldybini (Spassky, 1947)

Hosts: Sorex alpinus and S. araneus. - Localization: small intestine. - Intensity: 2-35 specimens per host. - Date of collection: in S. alpinus, Lenartov 10-12 Nov., 1981 (2 cases), in S. araneus, Lenartov 10-12 Nov., 1981 (3 cases).

Note. H. schaldybini is a common parasite of Sorex species. The characteristics of the examined specimens agree with the description given by VAUCHER (1971).

Hymenolepis scutigera (Dujardin, 1845)

Host: Sorex araneus. - Localization: small intestine. - Intensity: one specimen. - Date of collection: Hertník 26-28 Aug., 1980 (1 case).

Note. The morphology of the examined specimen agrees well with the description given by VAUCHER (1971), but the absence of hooks renders the identification uncertain. The species is known from Slovakia.

Hymenolepis spinulosa Cholodkowsky, 1906

Host: Sorex araneus. - Localization: small intestine. - Intensity: one specimen. - Date of collection: Lenartov 10-12 Nov., 1981 (1 case).

Hymenolepis tiara (Dujardin, 1845)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: only one specimen was found. - Date of collection: Lenartov 10-12 Nov., 1981 (1 case).

Note. H. tiara is a parasite of Crocidura species, recorded by MITUCH (1964) from Slovakian Neomys fodiens. The occurrence of this species is substantiated by this work. The scolex of the tapeworm is 0.22 mm wide, diameter of suckers 110 µm, that of rostellum 55 µm, with 24 hooks 15-17 µm long on it.

Hymenolepis infirma (Zarnowski, 1955)

Hosts: Sorex alpinus and S. araneus. - Localization: small intestine. - Intensity: 2-40 specimens. - Date of collection: in S. alpinus, Hertník 26-28 Aug., 1980 (1 case), Livov 20-23 April, 1982 (2 cases); in S. araneus, Lenartov 10-12 Nov., 1981 (3 cases), Križe 14 May, 1983 (1 case).

Note. We found the specimens to correspond well with the description by VAUCHER (1971). From the 14th segment onwards there were ripe eggs 12-14 in number per proglottid.

Hymenolepis tripartita (Zarnowski, 1955)

Host: Sorex araneus. - Localization: intestine. - Intensity: 1-4 specimens. - Date of collection: Lenartov 10-12 Nov., 1981 (4 cases).

Note. Specimens of H. tripartita are characterized by the presence of rudimentary rostellum on the scolex, and proglottids of same developmental stage appearing periodically.

MESOCESTOIDIDAE

Mesocestoides sp. - tetrathyridium larvae

Intermediate hosts: Clethrionomys glareolus, Sorex alpinus and S. araneus. - Localization: liver tissue and abdominal cavity. - Intensity: 3 in S. alpinus, 5 specimens in S. araneus, 70 tetrathyridia in C. glareolus. - Date of collection: in S. alpinus, Livov 20-23 April, 1982 (1 case), in S. araneus, Lenartov 10-12 Nov., 1981 (1 case); in C. glareolus, Lenartov 10-12 Nov., 1981 (1 case).

Note. The larvae found in soricid species and the tetrathyridia in C. glareolus may belong to two different Mesocestoides species.

TAENIIDAE

Taenia martis (Zeder, 1803) larval stage

Intermediate host: Clethrionomys glareolus. - Localization: abdominal cavity. - Intensity: 1-2 specimens per host. - Date of collection: Livov 20-23 April, 1982 (3 cases).

Note. Larvae 20-50 mm long with the hook-crown characteristic for the species. Definitive hosts of the species are members of the genus Martes.

Taenia tenuicollis Rudolphi, 1819 - cysticercus larvae

Intermediate hosts: Clethrionomys glareolus and Pitymys subterraneus. - Localization: liver. - Intensity: 1-8 cysts in the liver tissue. - Date of collection: in C. glareolus, Hertník

26-28 Aug., 1980 (1 case), Lenartov 10-12 Nov., 1981 (2 cases), Livov 20-23 April, 1982 (5 cases); in P. subterraneus, Lenartov 20-23 April, 1982 (1 case), Livov 20-23 April, 1982 (5 cases).

Note. Definitive hosts of T. tenuicollis are mustelids (Mustela nivalis and M. erminea). The morphology of the cysticerci in the rodents examined correspond with the description given by MURAI (1982).

Hydatigera taeniaeformis (Batsch, 1786) - strobilocercus larvae

Intermediate hosts: Pitymys subterraneus and Apodemus flavicollis. - Localization: on liver surface. - Intensity: 1-3. - Date of collection: in P. subterraneus, Livov 20-23 April, 1982 (3 cases); in Apodemus flavicollis, Lenartov 20-23 April, 1982 (1 case).

Note. The definitive hosts of H. taeniaeformis are cats (Felis catus domesticus and F. silvestris). This species is a common parasite infesting various rodents as intermediate host.

Tetratirotaenia polyacantha (Leuckart, 1856) - armatetrathyridium larvae

Intermediate host: Pitymys subterraneus. - Localization: abdominal cavity. - Intensity: 17 specimens. - Date of collection: Livov 20-23 April, 1982 (1 case).

Note. Definitive host of the species is the red fox (Vulpes vulpes), which is not frequent in the Čergov Mountains, because of the occurrence of the wolf (Canis lupus) in the area.

NEMATODA

STRONGYLOIDIDAE

Parastrongyloides winchesi Morgan, 1928

Host: Sorex araneus. - Localization: small intestine. - Intensity: 3-10 specimens. - Date of collection: Lenartov 10-12 Nov., 1981 (4 cases); Livov 20-23 April, 1982 (1 case).

ANGIOSTRONGYLIDAE

Angiostrongylidae sp. 1 (Figs 14-15)

Host: Sorex araneus. - Localization: lungs. - Date of collection: Livov 20-23 April, 1982 (1 case).

Note. Though a number of nematode species are known from the lung of soricids (Paracrenosoma and Stefanskostrongylus species; see KONTRIMAVICHUS & DELYAMURE, 1979), the 2 male terminal parts dissected subsequently from the lung did not permit identification to the species. In fact even a number of such characters were not available, e. g. the position of the vulva, which would have been necessary to unequivocally determine the family that the species belongs to. However, as based on the greatly reduced bursa and the structure of the ribs, it must be closely related to the species Andersonstrongylus captivensis which WEBSTER (1978) described from Mephitis mephitis. Measurements: spicules 0.090-0.093 mm, gubernaculum 0.032-0.037 mm long.

ASCARIDIDAE

Porrocaecunm sp. larva

Host: Sorex araneus. - Localization: body cavity. - Intensity: 1-2 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case); Lenartov 10-12 Nov., 1981 (7 cases).

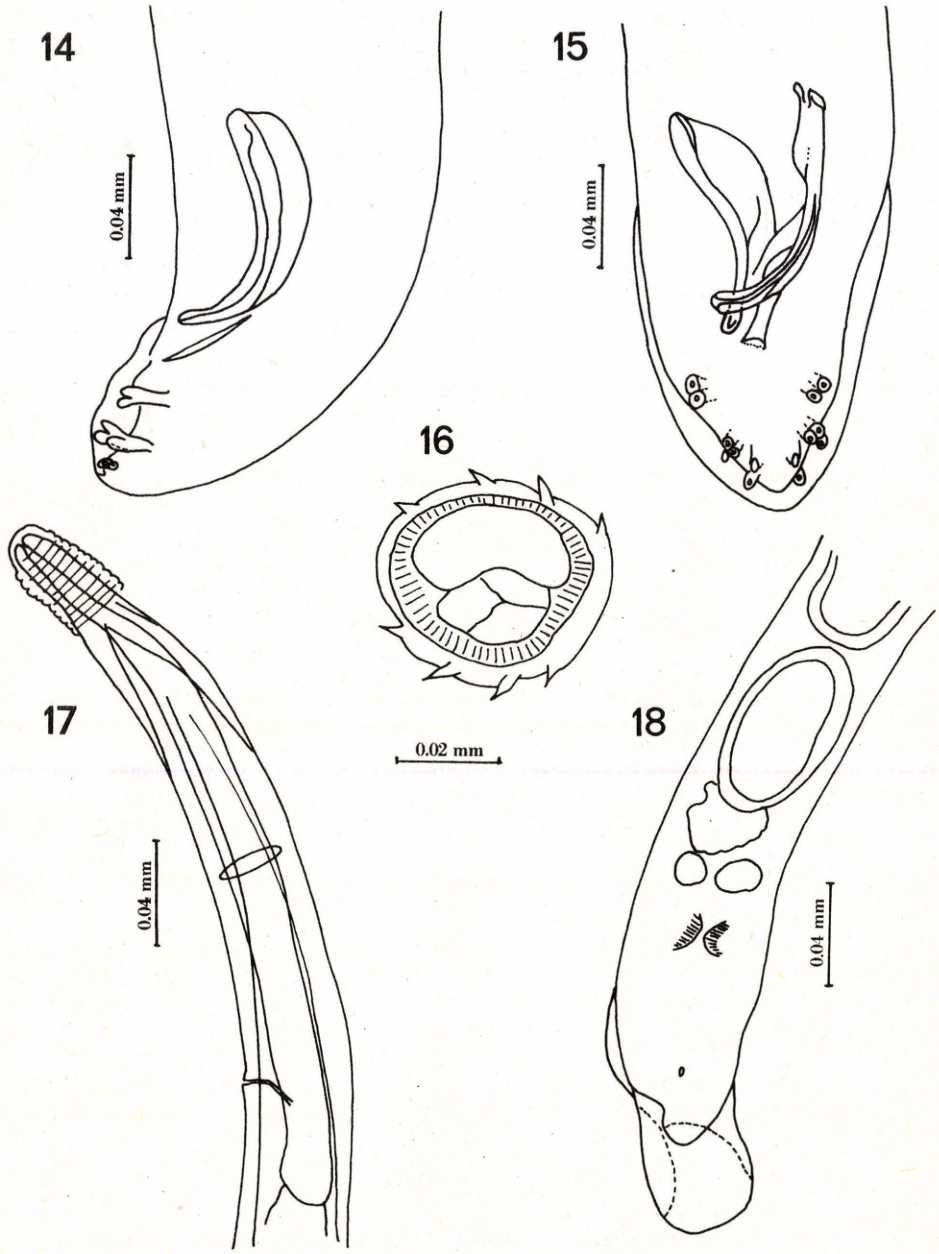
HELIGMOSOMIDAE

Heligmosomum costellatum Dujardin, 1845

Host: Microtus arvalis and Pitymys subterraneus. - Localization: small intestine. - Intensity: 2 specimens in M. arvalis, 1-6 specimens in P. subterraneus. - Date of collection: in M. arvalis, Lenartov 20-23 April, 1982 (1 case); in P. subterraneus, Hertník 26-28 Aug., 1980 (2 cases), Lenartov 10-12 Nov., 1981 and 20-23 April, 1982 (7 cases); Livov 20-23 April, 1982 (20 cases).

Heligmosomum mixtum Schulz, 1954

Host: Clethrionomys glareolus. - Localization: small intestine. - Intensity: 1-10 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (19 cases); Lenartov 10-12 Nov., 1981 and 20-23 April, 1982 (35 cases); Livov 20-23 April, 1982 (24 cases).



Figs 14-15: Angiostrongylidae sp. (14= tail end of male, lateral view; 15= tail end of male, ventral view)

Figs 16-18: Longistriata neomy (16= synlophe of female; 17= head end of female, lateral view; 18= tail end of male, ventral view) (Figs 14-18 orig. by Mészáros)

Heligmosomoides polygyrus polygyrus (Dujardin, 1845)

Host: Apodemus flavicollis. - Localization: small intestine. - Intensity: 1-24 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (8 cases); Lenartov 10-12 Nov., 1981 and 20-23 April, 1982 (8 cases).

Heligmosomoides glareoli Baylis, 1928

Host: Clethrionomys glareolus. - Localization: small intestine. - Intensity: 1-2 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (2 cases); Lenartov 10-12 Nov., 1981 (1 case); Livov 20-23 April, 1982 (1 case).

Longistriata depressa (Dujardin, 1845)

Hosts: Sorex araneus and S. alpinus. - Localization: small intestine. - Intensity: 1-4 specimens. - Date of collection: in S. araneus, Lenartov 10-12 Nov., 1981 (1 case); Livov 20-23 April, 1982 (1 case); in S. alpinus, Livov 20-23 April, 1982 (1 case).

Longistriata pseudodidas Vaucher & Durette-Desset, 1973

Hosts: Sorex araneus, S. minutus, and S. alpinus. - Localization: small intestine. - Intensity: 2-6 specimens. - Date of collection: in S. araneus, Lenartov 10-12 Nov., 1981 (7 cases); in S. minutus, Lenartov 10-12 Nov., 1981 (1 case); in S. alpinus, Livov 20-23 April, 1982 (1 case).

Longistriata neomi Lyubarskaya, 1962 (Figs 16-18)

Host: Neomys fodiens. - Localization: small intestine. - Intensity: 1 specimen. - Date of collection: Lenartov 10-12 Nov., 1981 (1 case).

The more important measurements of the single specimen found: length of body 3.40 mm, its width 0.051 mm. Synlophe: at the 4 lateral and 4 ventral cuticular ribs the latter ones slightly more developed. Vesicle 0.048 mm. Nerve ring situated 0.14 mm from anterior end, excretory pore 0.24 mm from some.

HELIGMONELLIDAE

Boreostrongylus minutus (Dujardin, 1845)

Hosts: Clethrionomys glareolus, Pitymys subterraneus and Microtus arvalis. - Localization: small intestine. - Intensity: 1-2 specimens in C. glareolus, 1-13 specimens in P. subterraneus, 4-118 specimens in M. arvalis. - Date of collection: in C. glareolus, Lenartov 10-12 Nov., 1981 (1 case), Livov 20-23 April, 1982 (2 cases); in P. subterraneus, Lenartov 10-12 Nov., 1981 (2 cases), Livov 20-23 April, 1982 (14 cases); in M. arvalis, Lenartov 10-12 Nov., 1981 (3 cases); Križe 21 April, 1982 (1 case). Occurs very rarely in C. glareolus.

OXYURIDAE

Syphacia frederici Roman, 1945

Host: Apodemus flavicollis. - Localization: caecum. - Intensity: 12-102 specimens. - Date of collection: Lenartov 10-12 Nov., 1981 (5 cases).

Syphacia montana Yamaguti, 1943

Host: Pitymys subterraneus. - Localization: caecum. - Intensity: 3-58 specimens. - Date of collection: Lenartov 10-12 Nov., 1981 (2 cases), Livov 20-23 April 1982 (7 cases).

Syphacia nigeriana Baylis, 1928

Host: Microtus arvalis. - Localization: caecum. - Intensity: 9 specimens. - Date of collection: Križe 21 April, 1982 (1 case).

PHYSALOPTERIDAE

Pseudophysaloptera soricina Baylis, 1934

Host: Sorex araneus. - Localization: stomach. - Intensity: 3 specimens. - Date of collection: Križe 14 May, 1983 (1 case).

CAPILLARIIDAE

Capillaria kutori Ruchljadeva, 1946

Hosts: Sorex minutus and Neomys fodiens. - Localization: stomach. - Intensity: 2-4 speci-

mens. - Date of collection: in S. minutus, Lenartov 10-12 Nov., 1981 (1 case); in N. fodiens, Lenartov 10-12 Nov., 1981 (1 case).

Capillaria incrassata (Diesing, 1851)

Host: Sorex araneus. - Localization: urinary bladder. - Intensity: 3 specimens. - Date of collection: Livov 20-23 April, 1982 (1 case).

Capillaria annulosa (Dujardin, 1843)

Host: Apodemus flavicollis. - Localization: small intestine. - Intensity: 4-60 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (1 case); Križe 14 May, 1983 (2 cases).

Thominx oesophagicola (Soltys, 1952)

Host: Sorex araneus. - Localization: esophagus. - Intensity: 1-2 specimens. - Date of collection: Križe 14 May, 1983 (2 cases).

SOBOLIPHYMIDAE

Soboliphyme soricis Baylis & King, 1932

Host: Sorex araneus. - Localization: stomach. - Intensity: 1-2 specimens. - Date of collection: Hertník 26-28 Aug., 1980 (2 cases).

ACANTHOCEPHALA

CENTRORHYNCHIDAE

Centrorhyncus buteonis (Schrank, 1788) - juvenile form

Intermediate hosts: Sorex alpinus and S. araneus. - Localization: liver surface and abdominal cavity. - Intensity: 1-6 specimens. - Date of collection: in S. alpinus, Livov 20-23 April, 1982 (1 case); in S. araneus, Lenartov 10-12 Nov., 1981 (1 case). - Definitive hosts of the species are raptorial birds.

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